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ORTHODONTIC APPLIANCE
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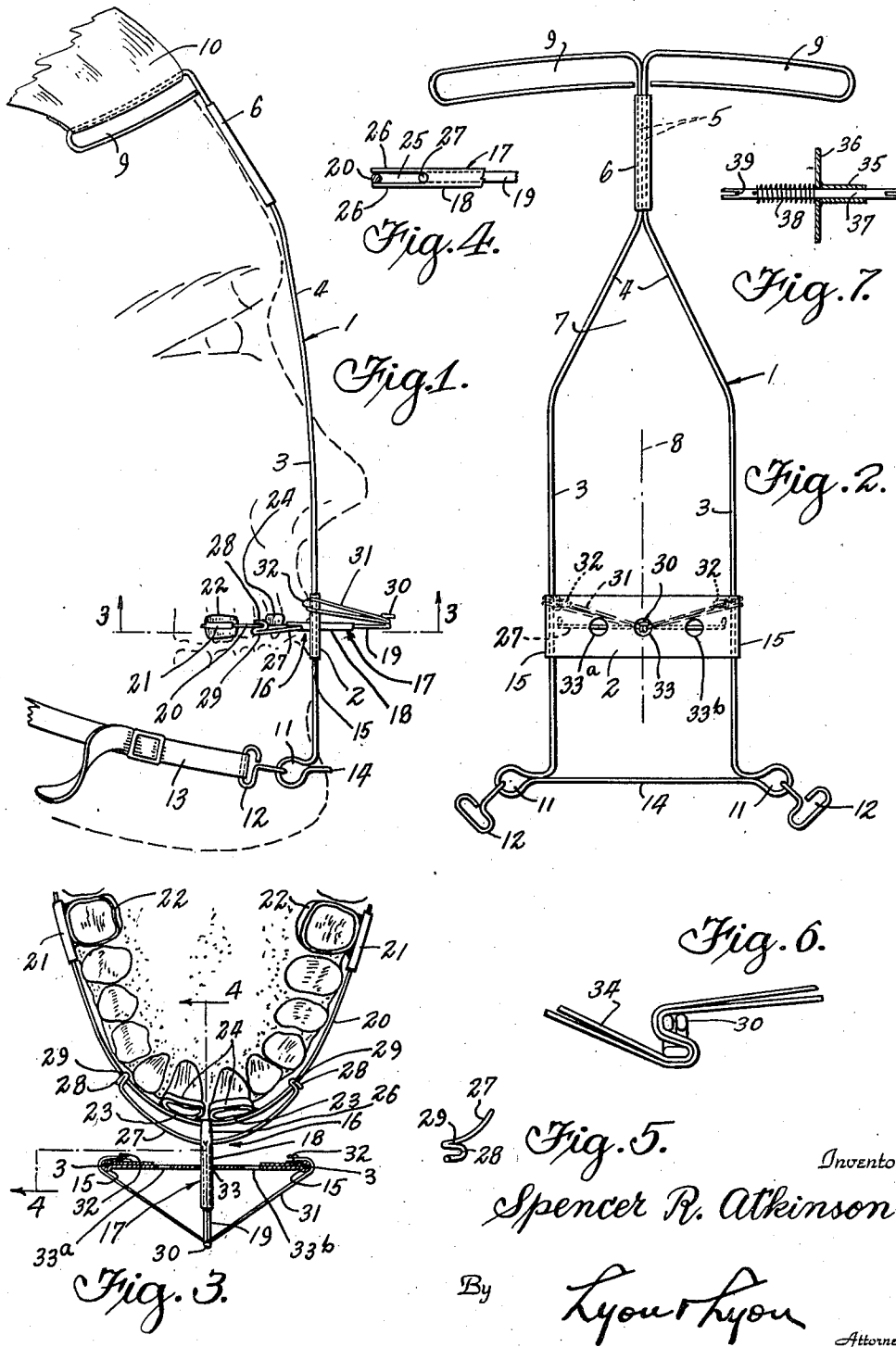


Fig. 5.
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ORTHODONTIC APPLIANCE

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This invention relates to an orthodontic appliance including a frame capable of being secured before the patient's face, for supporting means for subjecting the tooth or teeth to be corrected, to the orthodontic correcting force.

One of the objects of the invention is to provide an appliance of this kind of simple construction, having means for enabling the correcting force to be applied advantageously; also to enable this force to be applied at a location removed laterally from the medial central vertical plane through the mouth, when desired.

One of the objects of the invention is to provide simple means for affording a support for a member that imparts the corrective force to the tooth, and for enabling this point of support to be adjusted vertically to the level of the jaw and the tooth to which the corrective force is to be applied.

A further object of the invention is to provide means whereby a torsional force or torque can be applied to the tooth to be corrected, or to an arch connected to the tooth that is to be corrected.

A further object of the invention is to provide a frame of simple construction, adapted to be applied to the patient's face and capable of maintaining itself secured in position, and to provide means supported on the frame and yieldingly imparting the correcting force to the tooth, the arrangement being such that the means for applying the yielding force is confined to the connection between the supporting frame and the member that connects with the tooth or teeth to be corrected, thereby rendering it unnecessary to have the frame secured in a tight and uncomfortable condition on the patient's face.

A further object of the invention is to provide a frame adapted to be used for an appliance of this kind, which is of simple form and readily constructed of wire.

Further objects of the invention will appear hereinafter.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient orthodontic appliance.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

Fig. 1 is an elevation viewing the appliance from the side of the patient's face, and in this view the patient's face is outlined in dotted lines

to indicate how the frame fits to it. This view also illustrates an arch applied to the patient's teeth.

Fig. 2 is a front elevation of the frame of the appliance and immediately associated parts, without illustrating any of the headgear or straps which are employed for securing the frame to the patient's face.

Fig. 3 is a horizontal section taken about on the line 3-3, looking upwardly, diagrammatically illustrating the jaw and the patient's teeth. This view illustrates the arch and its anchorages, and also the means by which connection is effected to the teeth to be corrected.

Fig. 4 is a vertical section taken about on the line 4-4 of Fig. 3, and further illustrating the means by which connection is had to the tooth or teeth to be corrected. In this view the outer portions of the parts are broken away.

Fig. 5 is a perspective broken away and showing one end of a bow which I prefer to employ for effecting the connection to the orthodontic arch attached to the teeth to be corrected.

Fig. 6 is a detailed view upon an enlarged scale, and further illustrating the manner in which a torsional force or torque can be developed in the member that operates to impart corrective force to the tooth or teeth to be corrected. In this view the tension member or elastic band, is shown with its outer ends broken away.

Fig. 7 is a fragmentary vertical section illustrating a modified embodiment of a detail of the invention.

In practicing the invention, I provide means for imparting the corrective forces to the tooth or teeth, and I provide means for supporting the same before the patient's mouth so as to adapt the point of application of the force to the upper or lower jaw of the patient, and to the front teeth or laterally disposed teeth adjacent to the front teeth. In order to accomplish this I prefer to provide a frame 1 which comprises guide means for a transverse bar or cross-head 2. This frame is preferably constructed of wire in such a way that it presents two substantially vertical, parallel forks or guide bars 3 having converging extensions 4 at their upper ends. Above these extensions 4 the material is bent so as to form two parallel shanks 5 which are attached together preferably by means of a flat sleeve 6 folded around the same, and which is adapted to lie against the patient's forehead. The extensions 4 form an inverted V-shaped notch or throat 7, and when the sleeve 6 is placed centrally on the patient's forehead, this notch 7 will receive the

patient's nose so that the vertical bars 3 will be disposed equidistant from the central medial plane of the patient's face, which coincides with the axial line 8 indicated in Fig. 2. The upper and lower ends of the frame are provided with means for enabling the same to be secured to headgear, and for this purpose the wire at the upper end of the frame is preferably formed with two large eyes 9 to which the forward ends of flexible straps 10 associated with the headgear, may be attached. The lower ends of the frame may be bent outwardly to form eyes 11 to which small wire shackles 12 are secured for the attachment of adjustable chin straps 13 that are connected with, or form a part of, the headgear; and in addition to this, the frame is preferably formed with a horizontal or transverse chin bar 14 that is slightly curved or bowed outwardly in a horizontal plane to enable it to fit to the patient's chin. The cross-head 2 is preferably formed of a metal plate, the ends of which are bent around to form sleeves 15 that are friction-tight on the bars 3. This cross-head operates as a support, and in the present instance also, as a guide for the means 16 that operates to impart the orthodontic stress. This means 16 preferably includes a strut member 17 that may include a tubular, inner part 18 and a stem 19 that projects outwardly from the outer end. This force-imparting means 16 is supported on the cross-head 2 and constructed so that it can impart a force in a horizontal plane to the tooth to be corrected, and also so that torsional force can be exerted upon a tooth or teeth. Although this means could obviously be attached directly to a tooth band for imparting the corrective force, in the present instance I have illustrated it as attaching to a wire arch 20 such as commonly employed in effecting orthodontic corrections. This arch follows the contour of the jaw and lies adjacent to the patient's teeth in the usual manner, the ends of the arch being anchored in the sleeves or sockets 21 that are attached by anchor bands 22. These bands 22, in the present instance, are illustrated as secured on a pair of molars, but of course, if desired, the ends of this arch can be anchored on any other teeth as may be suggested, by the practice of appropriate technique. The ends of the wire arch 20 may be rigidly secured in the sleeves 21, or may be rigidly secured in one of the sleeves and mounted to slide in the other; or, in some cases, both ends of the arch can be mounted to slide longitudinally in these sleeves. In the present instance the arch 20 is represented as secured at the points 23 to two tooth bands 24 secured on the two forward incisors.

In Fig. 4 I illustrate the inner end of the strut member 17, the forward end of which is cut away to form a deep slot or throat 25 capable of receiving the middle portion of the arch 20 between two forks 26. The throat 25 is formed between these two forks, and the rear end of the throat operates as a socket for the middle portion of a bow 27 preferably formed of bent wire. The ends of this bow 27 are formed with means such as hooks 28 to attach to the arch 20. In other words, the means for attaching the strut member 17 is preferably made so as to afford three points of attachment to the arch. The hooks 28 may have any desired form, but are preferably formed substantially as indicated in Fig. 5, which indicates that the hook 28 is formed in a substantially vertical plane, the bill of the hook 28 being located below the junction point of the hook with the arch; the hook has an inwardly bent bifurcated

spur 29, that is to say, a spur that projects inwardly toward the medial plane.

Means is provided for exerting the corrective force on the strut member, which in turn imparts the corrective force to the arch, or as may be, directly to the band of a tooth that is to be corrected. In order to accomplish this, I prefer to provide the strut member 17 with an upwardly offset hook 30 to provide a point of attachment for resilient means such as a band 31 of rubber or other elastic means, the ends of which pass around the outer sides of the guide bars 3 adjacent the upper edges of the cross-head 2, and are secured to small tongues or hooks 32 that are struck out from the material of the cross-head 2 which, as illustrated, is preferably in the form of a wide plate. The middle portion of the strut member is guided through a centrally disposed guide opening 33 in the cross-head. With this construction it will be evident that when the middle portion of the elastic member 31 is applied to the hook 30, an inward thrust force will be developed in the thrust member 17, and in the bow 27, which force is imparted through the bands 24 to the teeth carrying the bands 24. In the present instance, the orthodontic appliance is illustrated as employed to correct excessive protrusion of these teeth.

In order to enable a correcting force to be applied in a lateral position, the cross-head 2 is preferably provided with two or more laterally disposed guide openings 33a and 33b similar to the opening 33, but located respectively on opposite sides of the medial plane indicated by the line 8.

If it is desired to develop a torsional or torque force in the strut member 17, and to impart such a force to a tooth or teeth to be corrected, this may be accomplished by attaching an elastic band 34 to the hook 30 as illustrated in Fig. 6. In doing this a portion of the band is set across the upper side of the hook 30, and the band is then carried through the hook in one direction and returned toward the other side by passing the same under the strut member. With this disposition of the elastic band it will be evident that the tension in it will exert a torsional force urging to rotate the strut member 17 on its own axis. Of course, if the hook 30 is disposed in an outboard position as illustrated in Fig. 1, this torsional force will be accompanied by an inward thrust force in the strut member. However, it will be evident that by shortening the length of the outer portion of the strut member so as to bring the hook 30 in quite close to the cross-head 2, it would be possible to use the appliance for exerting a torsional effect such as described, without any substantial inward thrust force against the tooth.

When the appliance is used in case of a fracture, I may provide a tubular guide 35 on the outer side of the cross-head 36, for the stem 37, and provide a coil spring 38 to thrust against the inner face of the cross-head so as to exert its force to thrust the bow 39 rearwardly toward the patient's jaw.

Many other embodiments of the invention may be resorted to without departing from the spirit of the invention.

What I claim is:

1. In an orthodontic appliance, the combination of a frame member with means for securing the same extending down in a substantially vertical plane before the patient's face and mouth, a cross-head carried on the frame member, a strut guided on said cross-head and projecting

inwardly beyond the cross-head, a tooth band on the tooth to be corrected, connected to the strut, means for developing a torsional force in the strut about its own longitudinal axis for imparting the torsional force to the tooth to effect the orthodontic correction.

2. In an orthodontic appliance to be employed with means secured to the tooth or teeth to be corrected, the combination of a frame with means for securing the same before the patient's mouth, a stem supported on said frame, having means at its inner end for securing the same to said first-named means, said stem having an elongated body with an offset portion; and resilient means secured on the frame and attached to the said offset portion of the stem for exerting torsional force upon the same to impart a torsional strain to the tooth or teeth to be corrected.

3. In an orthodontic appliance, a frame having a pair of substantially parallel side bars with means connecting the same at their upper ends, said last-named means adapted to lie against the patient's forehead, said frame including at its upper end a pair of laterally disposed eyes for attachment to flexible headgear, and having a pair of laterally disposed shackles adjacent the lower ends of said bars for the attachment of straps for the headgear, and a cross-head movable on the side bars and capable of being positioned at any desired elevation before the patient's mouth.

4. In an orthodontic appliance, a frame formed of bent wire having a pair of substantially parallel oppositely disposed side bars, said side bars having converging extensions above, with shanks lying adjacent to each other, and having means for securing the same together, the material above said shanks being bent laterally to form eyes for attachment to headgear, said frame having a transverse chin bar at its lower end adapted to rest upon the patient's chin, connected integrally with the lower ends of said side bars, and having means at its ends for securing chin straps.

5. In an orthodontic appliance, the combination of a frame member with means at its upper end for securing the same at the patient's forehead and so that the frame member extends downwardly past the patient's mouth and immediately before the same, said frame having means at its lower end to engage the patient's chin with means associated therewith for pressing the same against the patient's chin, to maintain the frame in a fixed relation to the patient's mouth, a cross-head carried on the frame member and comprising a transverse bar extending in a substantially horizontal direction across immediately in front of the patient's mouth, and means supported on the cross-bar for exerting yielding pressure in a general horizontal direction and transverse to the dentition line to attain the desired orthodontic effect.

6. An orthodontic appliance constructed as defined in claim 5, in which the cross-head is provided with means at different points spaced along its length for supporting the said means for exerting yielding pressure.

7. In an orthodontic appliance, the combination of a frame member having means at its upper end for securing the same on a patient's forehead, said frame member including a pair of substantially parallel spaced bars extending downwardly and located respectively toward each side of the patient's mouth, a cross-head having means at its ends for engaging said bars for adjustment up or down on the same for disposing the cross-head in position immediately in front of the patient's mouth, said cross-head having a plurality of guiding means spaced apart on the same, and located respectively adjacent the middle of the cross-head, and toward its ends, and a pressure exerting member guided on the cross-head in any of said guiding means and having means associated therewith for exerting a yielding force upon a tooth in a general horizontal direction and transverse to the dentition line.

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